

REMARKS

Claims 9-11 are currently active.

Claim 9 has been amended in response to the 112 rejection, consistent with the Examiner's request.

The Examiner has rejected Claim 9 as being anticipated by or obvious from Keller. The applicants respectfully traverse this rejection in view of the amendment to Claim 9.

In the patent by Keller- 3,657,592, he utilizes a different type of diffusion bonding. He is diffusing impurities from the joining material into the, to be joined materials made of graphite. For complete reaction Keller requires 1500 °C and to form SiC in the joint up to 2000 °C. Since the claim as amended now considers only joining ceramics as suggested by the examiner, the Keller patent is not relevant since it involves joining of non-ceramics such as graphite.

The Examiner has rejected Claims 9-11 as being unpatentable over Coes in view of Mizuhara in view of Ewart-Paine. The applicants respectfully traverse this rejection in view of the amendment to Claim 9.

Both patents: Coes- 4,070,197 and Mizuhara-4, 783,229 utilize a bonding mechanism which is known as diffusion bonding. High joint strength is obtained with diffusion bonding **only** at very high temperatures, that is, near the softening temperature of the original materials. This is exactly what applicants are trying to avoid. In the patents above: Coes required 1970-2150 °C for silicon carbide (SiC) materials (column 2, lines 36-45) and Mizuhara required about 1700 °C for alumina (Al₂O₃) materials (column 1, line 35, column 2, lines 14 and 42). Note that in the first two patents the high temperature causes softening of the materials to be joined in opposition to applicants' claimed invention. These two patents are not relevant to applicants' claimed invention, since they involve a different bonding mechanism than what is in applicants' claimed invention. Ewart-Paine's patent (5,407,504) requires: polishing to 6 micro-meters or less (col 2, lines 28-33), must be hydrofluoric acid etched (col 2, lines 34-44), requires pressure (col. 2, lines 60-65) to form the joint and must be powderized (col. 2, lines 45-50) from a solid (which is not a slurry). This definitely does not even resemble applicants' claimed invention.

The Examiner has rejected Claim 9 as being unpatentable over DE 26 04 171 in view of Barton. The applicants respectfully traverse this rejection in view of the amendment to Claim 9.

Patent # DE 26 04 171 is an incomplete patent without detailed specification of the joining method and to add Barton's (patent #6,214,472) joining procedure makes no sense. Starting with patent # DE 26 04 171 they are trying to achieve joints with a service temperature of 1350 °C (bottom of the second paragraph in description) whereas Barton's joining process is design limited to a service temperature of 1200 °C (col. 1, lines 60-65; col. 2, lines 4, 30, 41, 62). Barton's joining was developed for fiber composites (col. 1, line 65 to col. 2, line 5) not monolithic Si_3N_4 to monolithic Si_3N_4 (middle of paragraph 5 in description) nor monolithic SiC to monolithic SiC. DE 26 04 171 does not specify a joining material with compatible chemistry or a joint thickness which substantially impacts the joint strength and the porosity or a joining temperature or anything related to a joint design and nothing specifically on what is a suitable taper. Furthermore, Barton's process has an excessive heating rate of 10 °C per minute in the range of 23-400 °C (col. 5, lines 60-65, col. 9, lines 4-7) which is well known by one skilled in the art to create both weak and porous (non hermetic) joints. The weak joints established by Barton are seen in all the examples. The flexural strengths should be well over 100 MPa and most of Barton's results are 50 MPa or less. Also, the large weight

loss is indicative of a porous joint. Barton does not provide any measurements of hermaticity.
Simply put, patent DE 26 04 171 and Barton cannot be combined.

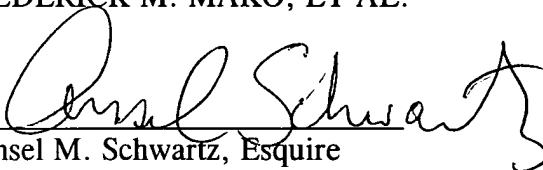
Accordingly, Claims 9-11 are patentable over the applied art of record.

Certified translations of DE 26 04 171 and Kokai are enclosed.

In view of the foregoing amendments and remarks, it is respectfully requested
that the outstanding rejections and objections to this application be reconsidered and
withdrawn, and Claims 9-11, now in this application be allowed.

Respectfully submitted,

FREDERICK M. MAKO, ET AL.

By 
Ansel M. Schwartz, Esquire

Reg. No. 30,587

One Sterling Plaza

201 N. Craig Street

Suite 304

Pittsburgh, PA 15213

(412) 621-9222

Attorney for Applicants